1878MNRAS..38..302P

On Mr. Stone's Note in the January Number of the Monthly Notices. By Richard A. Proctor, B.A., Hon. Fell. King's College, London.

Mr. Stone calls my attention to a Paper by Sir G. Airy, in vol. xxiv. of the *Monthly Notices*, showing that the part of the disk of the Sun seen through a refracting medium, causing an effect analogous to that of a convex lens, will not be of greater apparent brightness than the rest. He is right in presuming that I was unacquainted with Sir G. Airy's investigation when my paper was written; but not quite so in saying that the investigation covers the ground of my paper, if at least he correctly sums up its results as this, that "no refraction can cause a change in the apparent brightness of the surface visible." For in my paper I considered the possibility of reflexion as well as refraction, and of various conceivable combinations of both reflexion and refraction. In the article entitled "Notes on Brightness," referred to in my paper, I considered the effect of all possible combinations of reflexion and refraction, including, though not specially mentioning, the case of refraction through prisms, which some seem to suppose competent to increase the absolute apparent lustre of a surface. This cannot actually happen, though the relative lustre of an object and its surroundings may be so modified that the visibility of the surface may be greatly strengthened, or (as in the case of the solar prominences) an object rendered visible which was before undiscernible.

My remarks related entirely to intrinsic surface brightness. So that, as far as nebulæ are concerned, they only apply to cases where (whether by varieties of telescopic power or of distance) a nebula is neither so magnified that individual component stars are seen, nor so reduced in size as to seem a mere point. In the former case the individual stars necessarily appear brighter with increase of telescopic power, or diminution of distance; in the latter the nebula as a whole does so. It is hardly necessary to say that the satellites of *Mars*, appearing as mere points in the most powerful instruments yet made, cannot be used to illustrate the subject of apparent intrinsic brightness. I was so careful to draw a distinction between intrinsic brightness and quantity of light, that I cannot recognise the justice of the distinction drawn by Mr. Stone between what I said and what I probably meant. He asks why, if my statement (ending with the words that "quantity of light can of course be greatly increased") were true, the satellites of *Mars* could not as easily be seen with a 4-inch as with a 26-inch telescope; a question which actually contains its own answer, viz. that quantity of light is of course greatly increased when the larger telescope is used.*

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* At the meeting when the present paper was read, it was suggested that Mr. Stone may have referred to the different dimensions of the diffraction disks

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Unless, indeed, it be necessary to explain that the visibility of an object depends in some degree on the quantity of light we receive from it.

I am sorry, on the other hand, to have misinterpreted Mr. Stone's own remarks about gaseous nebulæ. Without, however, for a moment questioning his having really intended his paper to be understood as he explains (in fact, few actions can be more discourteous or unjust than to question anyone's explanation of his own words), I must say that it does not seem to me that he succeeded in clearly indicating his meaning in his former paper. He not only did not dwell upon, but he did not even mention the physical processes which would result from the actual, as distinguished from the optical, overlapping of the gaseous envelopes surrounding the component stars of the clusters he considered. It was a natural mistake, therefore, to suppose that his remarks referred only to optical over-lapping. My remarks applied only to his reasoning so misunderstood.

Observations of Shooting Stars in 1877. By W. F. Denning, Esq.

The following table of radiant points observed in 1877 is presented as a continuation of my paper in the *Monthly Notices*, vol. xxxvii., pp. 105–115, giving a similar list of results for 1876. In 1877 the paths of 1,929 shooting stars were registered, and of this total the great majority (1,593) were seen during the last half of the year. The estimated magnitudes were as follow:—

> 1st.	= 1st.	= 2nd.	= 3rd.	= 4th.	= 5th.		Total.
45	118	346	491	636	293	=	1,929

Observations were made nearly every fine night in the absence of moonlight, and were about equally divided in the aggregate between the morning and evening hours. In the table of radiants I have given the number of meteors traced from each centre, and have affixed notes to them, which render any detailed preliminary references unnecessary. The chief radiants were:—

No.	Period.	Radiant. ° °	No. of ↓s.	No.	Period.	Radiant. ° °	of ↓s.
1	Jan. 4–20	295+53	20	97	Oct. 2—Nov. 13	104+49	36
49	July 6—Aug. 16	7+37	37	99	Oct. 2—Nov. 13	105+12	33
62	July 6—Aug. 16	334+44	24	106	Oct. 2—Nov. 13	113+27	21
53	July 6—Aug. 16	7+53	20	117	Oct. 2—Nov. 13	101+73	23
52	July 6—Aug. 16	315+50	21	113	Oct. 2–18	133+79	22
65	Aug. 10	43+58	285	89	Oct. 15–20	92+1	57
109	Sept. 4—Oct. 19	84+54	26	118	Oct. 15—Nov. 13	130+1	30
108	Sept. 4—Oct. 19	108+38	20	122	Oct. 28—Nov. 13	43+2	31

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of the satellites as seen with large or small telescopes. But I find nothing in Mr. Stone's own words which can be so interpreted.

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